polarised ray. A series of experiments was made on the valeric acids obtained from active and inactive amylic alcohols, and also on the acid obtained from leucin; this latter is found to rotate a ray of polarised light to the right, but not to so great an extent as the acid which is obtained from the left-handed amylic alcohol. The acids from isobutyl cyanide, from valerian root, and from inactive amylic alcohol, show very great similarity; whilst the acids from the active alcohol and from leucin agree in most of their properties. The valeric acid made from inactive amylic alcohol is almost certainly isopropacetic acid, and that from the active alcohol is probably methethacetic acid, although the authors consider that the latter acid might possibly be a molecular compound of two isomeric acids, such as isobutylformic and methethacetic acids. Besides this communication, there are several important physiologico-chemical papers, together with translations of two others from foreign periodicals.

THE *American Naturalist* for February commences with an exhaustive account of the Mountains of Colorado by Dr. J. W. Foster, read before the Chicago Academy of Sciences. Mr. E. L. Greene, in a short paper on the Irrigation and the Flora of the Plains, shows how a gradual alteration is going on in the character of the flora of those parts where a system of irrigation has been established, *Typha* and other marsh and water plants supplanting the original inhabitants of the drier plains. Mr. John G. Henderson, on the former range of the buffalo, brings forward evidence to show that the buffalo was at a not very remote period extremely abundant over almost the whole of the Northern United States, while he thinks that it is doomed in a short time to become extinct like the great Irish elk, the mastodon, and the dodo. The remainder of the number is occupied with reviews and short notes.

A CONSIDERABLE portion of the *Canadian Naturalist*, vol. vi., No. 2, is occupied with a report of the Edinburgh meeting of the British Association. Prof. Dawson continues his note on the Post-pliocene Geology of Canada. Prof. H. A. Nicholson (late of Edinburgh) contributes an article on the "Colonies" of M. Barrande, in which the best account we have yet seen is given of the celebrated theory of the French palæontologist. Dr. J. W. Anderson has a short article on the Whale of the St. Lawrence; Mr. S. W. Ford some notes on the Primordial Rocks in the vicinity of Troy, N. Y.; and Mr. E. S. Billings a paper on some new species of Palæozoic Fossils belonging to the classes Pteropoda and Brachiopoda.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 21.—"New Researches on the Phosphorus bases," by Dr. A. W. Hofmann, F.R.S. Ten years since the author presented to the Royal Society a series of papers on the remarkable group of phosphorus compounds first discovered by Thenard in 1847. These researches were devoted to the investigation of the tertiary and quartary derivatives of phosphoretted hydrogen, exclusively accessible by the methods then known. Since then numerous attempts have been made to prepare the primary and secondary phosphines, but with no result until the present time. The author wishing to obtain pure phosphoretted hydrogen for lecture experiments, was led to prepare it by the action of water or soda on the beautiful compound of phosphoretted hydrogen and hydriodic acid. The ease with which this body decomposed led the author to think that it might be made available for the production of the missing compounds. For this purpose it was necessary to liberate phosphoretted hydrogen in the presence of an alcohol iodide under pressure. This could be done by heating together the phosphonium iodide and alcohol iodide in presence of some substance capable of slowly decomposing the former body, such as zinc oxide. This process yields the alcoholic phosphines, easily giving rise to the formation exclusively of primary and secondary phosphines. A further simplification of the process was tried, namely, by utilising the hydriodic acid from the phosphonium iodide in the formation of the alcohol iodide to be acted on by phosphoretted hydrogen. This was accomplished by digesting the phosphonium iodide with the alcohol; by this method it was found that only the tertiary phosphines and the quartary phosphonium compounds already known were produced, but which were more easily and plentifully obtained by the new than by the old method. The reactions by which the various groups of phosphines are produced from phosphonium iodide are as follows, the reaction being assumed to take place in the methyl series:—

Primary Phosphines

$$2\,CH_3I + 2\,(H_3P\,.\,HI) + Zn\,O = 2\left[(CH_3)\;H_2P\,.\,HI\right] + Zn\,I_2 + H_2O$$

Secondary Phosphines

$$2\,CH_3I + H_3P\,.\,HI + Zn\,O = (CH_3)_2\,HP + Zn\,I_2 + H_2O$$

Tertiary Phosphines

$$3\,(CH_3\,.\,HO) + H_3P\,.\,HI = (CH_3)_3\,P\,.\,HI + 3\,H_2O$$

Quartary Phosphonium compounds

$$4\,(CH_3\,.\,HO) + H_3\,P\,.\,HI = (CH_3)_4\,PI + 4\,H_2O$$

The primary and secondary methylic derivatives of phosphoretted hydrogen are prepared by placing together in a sealed tube 2 molecules of methylic iodide, 2 molecules of phosphonium iodide, and 1 of zinc oxide. The mixture is heated to 100° for six or eight hours, when the reaction is complete; on cooling the tube contains a white crystalline solid, and also a considerable amount of compressed gas. The crude product of the reaction is first treated with water, which decomposes the salts of monomethylphosphine, liberating it as a gas, which is collected in concentrated hydriodic acid; and secondly with potash, which decomposes the salts of dimethylphosphine, and liberates the dimethylated phosphine as a liquid. The whole process must be conducted in an atmosphere of hydrogen, as the two bodies are powerfully acted on by the oxygen of the air.

Methylphosphine $CH_3\,H_2\,.\,P$, is a colourless and transparent gas of a most overwhelming odour, which, by cooling and by pressure, can be condensed to a colourless liquid floating on water. It boils at $-14°$ under a pressure of 0·7585 metre. At 0° it began to liquefy at 1¾ atmospheres pressure, and at 2½ atmospheres it was entirely liquefied. At 10° liquefaction commenced at 2½ atmospheres and was completed at 4 atmospheres pressure, and at 20° under a pressure of 4 and 4½ atmospheres. The volume weight of the gas was determined by decomposing a known weight of the iodhydrate over mercury. Experiment gave the number 24·35, the theoretical value being 24. Methylphosphine is nearly insoluble in water free from air; if it contain air the gas disappears, owing to oxidation; it is rather soluble in alcohol, more especially at low temperatures; ether dissolves but little at ordinary temperatures, but at 0° one volume of ether dissolves in less than 70 volumes of methylphosphine. When gently heated in contact with air it takes fire, as it does also in pressure of chlorine or bromine. By its union with acids it forms a remarkable series of salts, distinguished by the remarkable property of being decomposed by water.

The chlorhydrate is obtained by mixing methylphosphine with gaseous hydrochloric acid, the gases at once condense to beautiful four-sided plates; the iodhydrate $CH_6\,PI$ is obtained by passing the gas into a concentrated solution of hydriodic acid; it can be crystallised in plates, which may be easily sublimed.

Dimethylphosphine $(CH_3)_2\,HP$, obtained as above, is a transparent colourless liquid which is lighter than water and insoluble in it; readily soluble in alcohol and ether. Its boiling point is 25°. In contact with the air it instantly takes fire, and burns with a powerfully luminous phosphorus flame. It unites easily with acids, all its salts being exceedingly soluble. The chlorhydrate furnishes with platinum perchloride a fine crystalline salt.

Methylphosphine passed into fuming nitric acid is absorbed and oxidised, with the formation of a new acid, small quantities of phosphoric acid being also produced. The excess of nitric acid is removed by evaporation in a water bath, and the phosphoric acid by boiling with lead oxide, which forms the lead salt of a new acid which is soluble in acetic acid, and lead phosphate which is insoluble. The lead salt is decomposed by sulphuretted hydrogen, and the acetic acid removed by evaporation, which leaves the new acid as a crystalline mass resembling spermaceti, melting at 105°. Its composition is found to be $CH_3\,H_2\,PO_3$, and may be called methylphosphinic acid. It forms two series of salts, in which H_1 and H_2 are replaced by metals. The primary silver salt crystallises in beautiful white needles which, in contact with water, are converted into the secondary salt. The lead and barium salts of this acid have also been obtained.

Methylphosphinic acid has the same composition as methylphosphorous acid, but they are two absolutely different bodies. Methylphosphorous acid is an uncrystallisable ephemeral compound, decomposing at a gentle heat into phosphorous acid and methyl alcohol, whilst methylphosphinic acid may be distilled without decomposition.

Dimethylphosphinic acid, obtained in a nearly similar manner to the above, is a white crystalline solid, melting at 76°, and may be distilled without change. Its composition is $(CH_3)_2 H PO_2$; the silver, lead, and barium salts have been obtained, but do not crystallise so well as the salts of the last-named acid.

Phosphoretted hydrogen, on treatment with nitric acid, fixes four atoms of oxygen yielding tribasic orthophosphoric acid, whilst trimethylphosphine fixes only one atom of oxygen yielding trimethylphosphine oxide, a body which is no longer capable of forming saline compounds. We have thus a series of three bodies which may be looked on as derived from orthophosphoric acid by the replacement of hydroxyl by methyl:—$(HO)_3 PO$, orthophosphoric acid; $(CH_3) (HO)_2 . PO$, methylphosphinic acid; $(CH_3) HO_2 . PO$, dimethylphosphinic acid; $(CH_3)_3 PO$, trimethylphosphine oxide. An analogous series of bodies is known in the arsenic group.

The primary and secondary ethylic derivatives of phosphoretted hydrogen are prepared in a precisely similar manner to the methyl compounds, except that the tubes containing ethyl iodide, phosphonium iodide, and zinc oxide, must be heated to 140°—150° for six hours.

Ethylphosphine $(C_2 H_5) H_2 . P$, is a transparent mobile liquid, powerfully refractive, lighter than water, and insoluble in it. It boils at 25°, and has an overwhelming odour. Its vapour bleaches like chlorine; caoutchouc placed in it becomes transparent, and loses its elasticity. It is inflamed by chlorine, bromine, and nitric acid. It is isomeric with dimethylphosphine previously described. With acids it forms salts which are crystalline and are decomposed by water.

Diethylphosphine is a colourless transparent liquid, insoluble in water and lighter than it. Its odour is very penetrating and persistent. It boils at 85°, and forms corresponding salts to dimethylphosphine which are not decomposed by water.

The primary and secondary ethyl phosphines, on oxidation by nitric acid, yield precisely corresponding products to the methylphosphines already described.

By the action of benzyl chloride, phosphonium iodide, and zinc oxide at 160°, the author has succeeded in obtaining the benzyl phosphine in a similar manner as before described.

Benzyl phosphine, $(C_7 H_7) H_2 P$, is a liquid boiling at 180°, attracting oxygen with great avidity; it forms a beautifully crystalline iodhydrate, and also other salts corresponding to those obtained from methylphosphine.

Dibenzylphosphine, $(C_7 H_7)_2 H P$, is a crystalline body melting at 205°, which does not oxidise in the air, nor does it form salts with acids like the corresponding dimethyl and diethylphosphines.

The author has likewise obtained the phosphorus compounds in the propyl, butyl, and amyl series, the details of which will be shortly communicated.

Geological Society, March 20—"On the Wealden as a Fluvio-lacustrine Formation, and on the relation of the so-called 'Punfield Formation' to the Wealden and Neocomian." By C. J. A. Meyer. In this paper the author questioned the correctness of assigning the Wealden beds of the south-east of England to the delta of a single river; he considered it more probable that they are a fluvio-lacustrine rather than a fluvio-marine deposit, and attributed their accumulation to the combined action of several rivers flowing into a wide but shallow lake or inland sea. The evidence adduced in favour of these views was mainly as follows:—The quiet deposition of most of the sedimentary strata, the almost total absence of shingle, the prevalence of such species of mollusca as delight in nearly quiet waters, the comparative absence of broken shells such as usually abound in tidal rivers, and the total absence of drift-wood perforated by mollusca in either the Purbeck or Wealden strata. This Wealden lacustrine area the author supposed to have originated in the slow and comparatively local subsidence of a portion of a land-surface just previously elevated. He considered that during the Purbeck and later portion of the Wealden era the waters of such lacustrine area had no direct communication with the ocean. The changes from freshwater to purely marine conditions, which are twice apparent in the Purbeck beds, and the final change from Wealden to Necomian conditions at the close of the Wealden, were attributed to the sudden intrusion of oceanic waters into an area below sea-level. The author then pointed to the traces o terrestrial vegetation in the Lower Greensand as evidence of the continuance of river-action after the close of the Wealden period. In the concluding portion of his paper the author referred to the relation of the Punfield beds of Mr. Judd to the Neocomian and Wealden strata of the south-east of England. From the sequence of the strata, no less than on palæontological evidence, he considered the whole of the so-called "Punfield formation" of the Isle of Purbeck to be referable to the Lower Greensand of the Atherfield section. Mr. Godwin-Austen did not agree with Mr. Judd in calling the bed at Punfield the Punfield "formation;" it was merely a bed intercalated between beds of a different character below and above. Prof. Ramsay thought that the Purbeck strata were connected with lagoons in contiguity with a large river rather than with inland lakes. These, from time to time, owing to the oscillations of level, were covered with marine deposits. He did not think that the absence of gravelly deposits offered any serious difficulty in regarding the Wealden strata as marine. It seemed to him more probable, however, that the sands and clays of the Wealden were due to some ancient rivers on a large scale, and deposited at their mouths, though in some spots the beds were subject to the action of fresh and salt water alternately. He regarded the Neocomian as, to some extent, a marine representative of the Wealden, though of later date. Mr. Etheridge recalled the fact that Mr. Judd had correlated the Punfield fossils with those of the north of Spain, twenty-two species found in each being absolutely identical. He argued from this that the extent of the beds may have been far larger than might be supposed. Prof. T. Rupert Jones remarked that the Purbeck-Wealden lake theory had not only been intimated by several previous writers, but had been illustrated by maps by Messrs. Godwin-Austen and Searles Wood, Jun. The Chairman, alluding to the pseudomorphs of salt mentioned by the author, stated that they had been somewhat compressed, and thus modified in form. They had also been found in other beds in the Wealden. He commented on the extension of the Wealden strata even to the south of Moscow. In the Oxford and Buckinghamshire area there was evidence of great denudation of the Purbeck and Wealden beds prior to the deposit of the Neocomian, so that great changes would seem to have taken place, giving rise to a great amount of denudation towards the close of the Wealden period. Mr. Meyer agreed with Mr. Godwin-Austen and other speakers as to there having been a certain amount of denudation of the Upper Wealden beds prior to the deposit of others upon them, but this he regarded as merely local. It was the absence of shingle rather than of gravel to which he had alluded in his paper. He thought that there was a distinction to be traced between the Neocomian of the north of England and that of the south, and that the middle beds of one were equivalent to the lower beds of the other.

Zoological Society, March 19.—John Gould, F.R.S., vice-president, in the chair. The secretary read a report on the additions that had been made to the Society's collection during the month of February 1872, amongst which were specimens of the Sumatran rhinoceros, two-wattled cassowary, and other rare animals.—Mr. R. B. Sharpe exhibited some specimens of blue rock thrushes from Europe and Eastern Asia. After tracing the different plumages through which *Petrocossyphus cyanus* passed, he came to the conclusion that the Eastern blue rock thrush, *P. solitarius*, eventually becomes entirely blue like the European species, and that the birds usually called *P. manillensis* and *P. affinis* are merely stages of plumage of *P. solitarius*.—Major Godwin-Austen exhibited a skin of *Ceriornis blythii*, which had been obtained by Mr. Roberts, of the Indian Topographical Survey, in the Naga Hills.—Mr. Sclater exhibited and made remarks upon a specimen of the American yellow-billed cuckoo (*Coccyzus americanus*) which had been obtained near Buenos Ayres.—A communication was read from Prof. A. Macalister, of the University of Dublin, containing notes on a specimen of the broad-headed wombat (*Phazcolomys latifrons*).—A communication was read from Mr. W. E. Brooks, of Etawah, India, containing remarks on the Imperial eagles of India, *Aquila crassipes* and *A. bifasciata*.—A paper by Dr. J. E. Gray, F.R.S., was read, containing observations on the genus *Chelymys*, and its allies, from Australia.—Sir Victor Brooke, Bart., read a paper on *Hydropotes inermis* and its cranial characters, as compared with those of *Moschus moschiferus* and other Cervine forms.—Major Godwin-Austen read descriptions of new land and freshwater shells which he had recently met with in the Khási, North Cachar and Nágá Hills of N.E. Bengal.—Mr. Howard Saunders read some notes on the introduction of *Anser albatus* of Cassin into the European avifauna, and exhibited two examples of that species lately shot near Wexford in Ireland.

Chemical Society, March 21.—Dr. Odling, F.R.S., vice-president, in the chair.—The chairman announced that the

Faraday lecture would be delivered by Prof. Cannizzaro on Thursday, May 30.—A communication from M. Maumené, of Paris, was then read by the secretary, in which he denied the existence of the hyponitrous acid recently discovered by Dr. Divers (Proceedings of the Royal Society, xix. 425), on purely theoretical grounds, unsupported by any experiments or analyses. Dr. Divers, who was present, explained M. Maumené's theory. —An interesting discussion took place on theoretical points connected with some remarks made by Dr. Debus, in which he stated that no organic compound existed, in which the number of atoms of hydroxyl, HO, was greater than the number of carbon atoms.

March 30.—The President delivered the annual address, in the course of which he commented upon the comparatively small number of papers communicated to the Society. The apathy and lethargy from which chemical science in this country is at present suffering, he believed to be due to a great extent to our system of university education. After the officers and council for the ensuing year had been elected, and the usual votes of thanks proposed, the meeting was adjourned.

April 4.—Dr. Frankland, F.R.S., president, in the chair.—Dr. Schorlemmer, F.R.S., delivered a very interesting lecture "On the Chemistry of the Hydro-carbons," defining organic chemistry as the chemistry of hydro-carbons and their derivatives. The characteristic properties of the paraffin, olefine, and acetyline series, and their relations one to another, were discussed, also those of the great aromatic group, the speaker pointing out the great assistance derived from the atomic theory in determining both the constitution of isomeric compounds, and also the relations existing between the various members of the aromatic series.

Entomological Society, March 18, 1872.—Mr. F. Smith, vice-president, in the chair.—R. Meldola was elected a member. —Mr. Higgins exhibited beautiful species of *Cetoniidæ* from Java, including some apparently new.—Mr. Bond exhibited a dimorphic example of *Acronycta leporina*, one side of which was coloured and marked as in typical examples, the other side as in the variety *bradyporina*, the two forms having at one time been considered distinct species.—Mr. Smith said that the remarks on Siberian insects at the last meeting had induced him to make a minute examination of specimens of the hornet (*Vespa crabro*) from Europe, Siberia, and North America, and he found that individuals from these districts presented no appreciable variation. The Asiatic *V. orientalis* was, however, quite distinct.—Mr. Müller read notes on *Serropalpus striatus*, which beetle he considered to be a wood-feeder, and especially attached to fir-wood; hence its occurrence in a hose-warehouse at Leicester could only be considered as accidental.—The Secretary read a long account of the ravages of locusts in South Australia in December 1871, as related in the *South Australian Register* for January 2, 1872. The insects were described as coming in swarms that darkened the air, eating every morsel of vegetation. It was found that those individuals that had partaken of leaves of the castor-oil plant were immediately killed thereby, and larkspur seemed also inimical to them.—Mr. Horne related his experiences of locusts in India. The castor-oil plant had certainly no injurious effects upon Indian species, though they were affected by the leaves of the tamarind-tree.

April 1.—Professor Westwood, president, in the chair.—Dr. A. S. Packard, Jun., of Salem, United States, was present as a visitor.—Professor Westwood exhibited a large spongy oak-gall found on the ground under an oak, which Mr. Müller considered to be the work of *Cynips radicis*. He further alluded to the differences existing in the genital apparatus of various species of the genus *Cynips*, and exhibited drawings illustrating his remarks. Also, he alluded to the different structure existing in the antennæ of various species of fleas, and maintained that these insects formed a distinct order, *Aphaniptera*. Finally he produced drawings, sent to him by a correspondent, of a minute Hymenopterous insect of the genus *Coccophagus*, parasitic upon the common *Coccus* of the orange; and he remarked that now is the best time for finding the males of *Coccus*, and especially of that infesting espalier pear trees.—Mr. Müller read notes on the larvæ of *Anaspis maculata*, which he had obtained from the excrescences or outgrowths on a trunk of birch. —Mr. Butler read additional remarks on the *Pericopides*, especially referring to species recently described by Dr. Boisduval.—Mr. McLachlan read a paper on the external sexual apparatus of the males of the genus *Acentropus*, and exhibited drawings of this apparatus made from microscopic examination of individuals from various parts of England and the Continent. Although there were minute differences, he could find nothing to indicate, on these characters alone, that more than one species existed.

Geologists' Association, March 1.—Prof. Morris, vice-president, in the chair. "On the Geology of Hampstead, Middlesex," by Mr. Caleb Evans. The author described the deposits which had been exposed from time to time during the last few years in and near Hampstead. The principal excavations noticed were the several drainage works near Child's Hill, on Hampstead Heath, and in Frognal Lane, and the tunnel on the Midland Railway under Haverstock Hill. It appeared from these sections that the Lower Bagshot Sand which caps the hill passes downwards into a dark sandy clay about 50 feet thick abounding with fossils, especially *Voluta nodosa* and *Pectunculus decussatus*. The *Pectunculus* bed passes down into the London Clay of ordinary character, which forms the lower part of Hampstead Hill. The author noticed the great changes in physical geography which must have taken place during the time that intervened between the deposition of the Woolwich series and that of the Lower Bagshot Sand. He considered that remains of the glacial deposits probably exist on the north side of the hill. The position of these deposits on an eroded surface of the London Clay showed the large amount of denudation that had taken place prior to the Glacial epoch. The author, in conclusion, directed attention to the existing valleys around and to the north of Hampstead, which he considered had been formed by means of the springs issuing from the water-bearing Eocene sand and the glacial gravels. Mr. A. Bell thought the leaf-beds of the Middle Eocene indicated fresh-water conditions. Mr. H. Woodward considered the presence of *Zanthopsis* in these beds evidence of Marine or Estuarine origin. He pointed out the great value of the maps and sections exhibited by Mr. Evans. Prof. Morris spoke of the foreign equivalents of the London Eocenes, during the deposition of which great changes of level took place. Though there are no traces of the Woolwich beds in the Belgian area, these deposits are represented near Epernay in France, while the London Clay forms a considerable area in Belgium. The patches of London clay on Salisbury Plain indicate the extension of the Lower Eocene sea over that area, and Bracklesham species are found at Chertsey. With respect to the Glacial deposits the Professor considered their importance in Middlesex very considerable, and thought it not improbable that the towns of Barnet, Hendon, and Finchley owed their origin to the presence of these deposits. The physical features of the country north of Hampstead are different from those south of that place, and this difference is due to the glacial deposits. Though the valleys of the district have been formed as we now see them by the rivers, their formation commenced during the rise of the land from the sea.—"On a recently exposed section at Battersea," by Mr. John A. Coombs. This was a brief description of a section exposed at the works of the London Gas Company now in progress near Battersea. The Thames Valley gravels are cut through and several feet of the London Clay is exposed. The gravels, which show much false bedding, yield mammalian remains, but the *Cyrena fluminalis* has not been found. Several species of Mollusca have been found in the clay, but the most abundant fossil is a species of Echinodermata, the *Pentacrinus sub-basaltiformis*. Mr. Hudleston noticed that at the Law Courts site in the Strand the gravels were much more ferruginous than those at Battersea, and the clay immediately underlying the gravels was altered in colour and character to a much greater depth at the former than at the latter locality.—Mr. A. Bell thought the *Cyrena fluminalis* would never be found in these beds at Battersea, as it belongs he considered to beds of a different age.

Victoria Institute, February 4.—Mr. C. Brooke, F.R.S., in the chair. "Prehistoric Monotheism, considered in relation to Man as an Aboriginal Savage," being a reply to certain statements made by Sir John Lubbock in his work on Primitive Man. The paper combated the statements made by that writer, that man in his original state was a savage and without religious knowledge, from the results of investigations into the present condition of savages, from the earliest authentic records to be found in various countries, and from the writings of Aristotle, Herodotus, and others. Mr. Prichard stated that so far as his inquiries had extended, they confirmed the view taken in the paper, and the Rev. G. Percy Badger, who gave similar testimony, in alluding to an apology made by the author of the paper, for not quoting Scripture as an authority, stated that it was perhaps judicious, as it enabled him to refute Sir John Lubbock's statement on his own ground, though it seemed strange that the latter should prefer the authority of such as Herodotus, whose writings betrayed ignorance on several points, for instance, where he refuses to believe in snow existing in a land so hot that the inhabitants were black,—to the writings of Moses, which, as writings even, were of a much higher order.

PARIS

Academy of Sciences, March 25.—M. Serret presented a note by M. A. Mannheim, containing geometrical investigations upon the contact of the third order of two surfaces.—General Morin read a memoir on the simultaneous employment of electrical induction apparatus and apparatus of deformation of solids, for the study of the laws of the movement of projectiles, and of the variation of pressures in the bore of guns.—A memoir was also read by M. V. Albenque, relating to the theory of rifled artillery, and treating of the effects of the resistance of the air upon a solid of revolution animated by a simultaneous movement of rotation.—M. Phillips presented a note by M. Bresse on the determination of brachistochrones.—A note from Father Secchi was read, giving an account of injury done at Alatri by lightning striking a lightning-conductor, and passing from it to large water pipes.—A note by M. G. Volpicelli, on the use of the proof-plane in the investigation of electrical conditions, was read.—M. Wurtz communicated a note by M. G. Salet, on the absorption spectrum of the vapour of sulphur, in which the author claimed to be the first describer of this spectrum, which was noticed by M. Gernez at the meeting of the Academy on March 18. He stated that the most perceptible dark lines coincide with the luminous bands in the spectrum of sulphur in the flame of hydrogen.—A letter from M. Donati to M. Delaunay, on auroras and their cosmical origin, was read. The author considers these phenomena to depend on an exchange of electricity between the sun and the planets.—M. Delaunay announced the discovery at Bilk by M. Luther on the night of March 15-16 of a new planet of the eleventh magnitude. The discoverer proposes to name it *Peitho*.—The miserable dispute as to the priority of the invention of the preservation of wines by heat was continued by MM. Vergnette-Lamotte, Pasteur, and Thenard.—M. Wurtz presented a note on a new class of compounds of dulcite with the hydracids by M. Bouchardat. These compounds are crystallisable, but rather unstable.—M. Fremy presented a note by M. Prinvault on the action of bromine upon protochloride of phosphorus, by which he has obtained some curious and unexpected compounds.—A note by M. E. Jannetaz on a new type of idiocyclophanous crystals was presented by M. Delafosse.—M. C. Robin communicated a note by M. V. Feltz on the properties of the bones, in which the author stated that matters injected into the spongy tissues of the bones in the living subject are absorbed as rapidly as if they were introduced directly into the veins, from which he inferred that this spongy tissue is in direct connection with the veins, and must be regarded as forming a system of sinuses.—M. Champouillon, in a note presented by M. Larrey, stated that putrefaction is much more rapid in the dead bodies of alcoholised subjects than in those of comparatively sober individuals.—M. C. Robin presented a note by MM. Legros and Onimus containing an account of some experiments on spontaneous generation, in which the authors describe the production of fermentation within an egg penetrated with sugar by endosmotic action, and afterwards immersed in a fermenting solution of sugar.—A note by M. A. Gris containing general considerations upon the structure of the bark in the Ericineæ was communicated by M. Brongniart.—M. A. Baudrimont read a paper on the existence of mineral matter in plants, which contains some interesting results as to the amount of solid matter in fleshy plants.—M. Roulin presented a note by M. Triana on the *Gonolobus cundurango*, a South American plant, reputed to furnish a remedy for cancer.—A paper by M. L. Vaillant on the fossil Crocodiles of Saint-Gérand-le-Puy was communicated by M. Milne-Edwards. The author described three species, two belonging to the subgenus *Diplocynodon* (*D. Ratelli* Pomel, and *D. gracilis* n. sp.), and a true Crocodile allied to the African species (*Croc. æduinus* n. sp.)

BOOKS RECEIVED

English.—On Bone Setting: W. P. Hood (Macmillan and Co.)—The Natural History of the Year: B. B. Woodward (S. W. Partridge).—The Journal of Mental Science, No. 45 (Churchill).

DIARY

THURSDAY, April 11.

Royal Society, at 8.30.—Researches on Solar Physics—Part III.: W. De La Rue, F.R.S., B Stewart, F.R.S, and B. Loewy.—The Action of Oxygen on Copper Nitrate in a State of Tension: Dr. Gladstone, F.R S., and A. Tribe.

Society of Antiquaries, at 8.30.—On some of the Stone Remains of Brittany: Sir H. E. L. Dryden, Bart.

Mathematical Society, at 8.—On the Mechanical Description of certain Sextic Curves: Prof. Cayley, F.R.S.

Royal Institution, at 3.—Heat and Light: Dr. Tyndall.

London Institution, at 7.30.—On the Distribution of Coal in the British Islands, and its probable duration: R. Etheridge, F.R.S.

FRIDAY, April 12.

Astronomical Society, at 8.

Royal Institution, at 9—Rousseau's Influence on European Thought: J. Morley.

Quekett Microscopical Club, at 8.

SATURDAY, April 13.

Royal Institution, at 3.—The Star-Depths: R. A. Proctor.

Government School of Mines, at 8.—On Geology: Dr. Cobbold.

SUNDAY, April 14.

Sunday Lecture Society, at 4.—On Æther: the Evidence for its Existence, and the Phenomena it explains: Prof. W. K. Clifford.

MONDAY, April 15.

Victoria Institute, at 8.—On the Rationality of the Lower Animals: Rev. J. G. Wood.

TUESDAY, April 16.

Royal Institution, at 3.—On Statistics, Social Science, and Political Economy: Dr. Guy.

Zoological Society, at 9.—On the Mechanism of the Gizzard of Birds: A. H. Garrod.—On a supposed New Monkey from the Sunderbunds to the East of Calcutta: Dr. John Anderson.

Statistical Society, at 7.45.

WEDNESDAY, April 17.

Society of Arts, at 8.—On the Great Central Gas Company's Works: A. Angus Croll.

Royal Society of Literature, at 8.30.—On the Trade of Phœnicia with Ophir, Tarshish, and Britain: W. S. W. Vaux.

Meteorological Society, at 7.

THURSDAY, April 18.

Royal Society, at 8.30.

Royal Institution, at 3.—On Heat and Light: Prof. Tyndall, F.R S.

Society of Antiquaries, at 8.30.

Linnean Society, at 8.—On *Begoniella*, a new genus of Begoniaceæ: Prof. Oliver.—On three new genera of Malayan plants: Prof. Oliver.—On *Camellia scottiana* and *Ternstrœmia coriacea*: Prof. Dyer.

Chemical Society, at 8.—Notes from the Laboratory of the Andersonian University; On a Compound of Sodium and Glycerine; and On Benzylisocyanate and Isocyanurate: E. A. Letts.

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NOTICE

We beg leave to state that we decline to return rejected communications, and to this rule we can make no exception. Communications respecting Subscriptions or Advertisements must be addressed to the Publishers, NOT *to the Editor.*